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ABSTRACT

In a longitudinal study of 29 middle-class Japanese infants, an attempt was made to identify early temperamental dispositions that predict later attachment classification. Specifically, Ainsworth Strange Situation observations at 12 months of age were preceded by, among others, observation of distress evident in newborns when a nipple was removed; and, at 7.5 months, observations of separation distress, reaction to a stranger, and mother-infant interaction. Assessments were administered to two cohorts. Analysis of the data revealed the following results: (1) A total of 22 Cohort 2 infants were coded Type-B, 8 were coded Type-C, and none was coded Type-A. This distribution across attachment categories replicated the one found in Cohort 1. (2) In both cohorts a marginally significant trend toward crying was found among a majority of Type-C babies in the response to interruption to sucking task. (3) In both cohorts observation of the infants' response to the entry of a male stranger and temporary separation from their mothers at 7.5 months revealed more signs of fear behavior among Type-C than Type-B infants. It was concluded that the findings reported previously for Cohort 1 were replicated by results obtained for Cohort 2. (Author/RH)

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RELATION OF TEMPERAMENTAL DISPOSITION TO CLASSIFICATION OF ATTACHMENT : COMPARISONS OF THE RESULTS OBTAINED IN TWO INDEPENDENT SAMPLES

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The objective of this article is to see if the results obtained for Cohort 1 and reported previously under the same title were replicated by the findings obtained for Cohort 2. Two independent groups of infants (Cohort 1 and Cohort 2) that have been followed from birth were observed in a standard Ainsworth Strange Situation when they were 12 months old. Analysis of the assessments made at birth, 7.5 months and 12 months reveals the following results in the two cohorts : (1) Twenty-two Cohort 2 infants were coded Type-B, 8 were coded Type-C and none were coded Type-A. This distribution across attachment categories replicated the one that was found in Cohort 1 (18 Type-B, 11 Type-C and no Type-A). (2) There was a marginally significant trend in both cohorts toward crying among a majority of Type-C babies in RIS (response to interruption of sucking) task. (3) Observation of the infants' behavior to the entry of a male stranger and temporary separation from their mothers at 7.5 months revealed more signs of fear behavior on the part of Type-C than Type-B infants in both cohorts.

It was concluded that the findings reported previously for Cohort 1 were replicated by results obtained for Cohort 2.

Key words : attachment classification, infant temperament, neonatal cry.

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INTRODUCTION

We have, in our longitudinal study of 29 middle-class Japanese infants, attempted to identify early temperamental dispositions that predict later attachment classification (Miyake et al, 1983, 1985). Specifically, Ainsworth Strange Situation observations at 12 months of age were preceded by, among others, : (1) Observation of distress evident in newborns when a nipple is removed (cf. Bell, Weller, and Waldrop, 1971), and (2) An observation of reaction to a stranger and separation distress, as well as an observation of mother-infant interaction at 7.5 months. These assessments revealed differences between Type-B and Type-C infants (there were no Type-A infants) with regard to the tendency to be distressed in the newborn period and to become fearful at 7.5 months. Specifically, we found that a large proprotion of the infants who had been classified as Type-C had shown

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much crying in the neonatal period and fearfulness at 7.5 months, as compared to infants who had been classified as Type-B.

Our findings indicated that the attachment classification is not totally independent of the infant's temperamental disposition. However, the likelihood of a relationship between the infant temperament and the mother's mode of interaction cannot be ruled out yet.

We started the testing of a second cohort of mother-infant pairs in Sapporo in 1982 in expectation of obtaining data relevant to several issues : confirmation of the findings obtained for Cohort 1 ; increase in the number of longitudinal subjects ; and interaction between infant temperament and maternal interactional disposition in accounting for the patterns of attachment at 12 months of age.

In this report, we will present some of the longitudinal data obtained for Cohort 1 and Cohort 2 to see if the results obtained for Cohort 2 replicate those results already reported for Cohort 1.

METHOD

Subjects

Twenty-nine infants born in 1980 (Cohort 1) and 30 infants born in 1982 (Cohort 2) were successfully observed in the Ainsworth Strange Situation at 12 months of age. Of these 59 infants, 41 were followed from birth ; the remainder were recruited as supplemental subjects either at 4 months or 11 months of age. All families contacted were predominantly urban middle class living in Sapporo. The fathers were engaged in white-collar or professional occupations and the mothers, at the time of recruitment, planned not to be employed full-time. Infants were firstborn with no serious pre-or peri-natal complications. The number of infants reported in the following sections varies from period to period, since not all subjects were successfully tested at each observation.

Procedures

Assessments were made during the newborn period, and at 1, 3, 7.5 and 12 months of age for Cohort 1, whereas Cohort 2 infants were tested or observed during the newborn period, and at 2, 4, 7.5 and 12 months.

The assessments to be discussed in this report are restricted to those taken in both cohorts since our objective is to see if the findings from the first cohort are replicated by those from the second.

1. *Newborn assessments.* The reaction of infants to the interruption of sucking produced by the removal of a nipple was chosen to assess neonatal temperament (cf. Chen, 1985).

2. *Assessments at 7.5 months.* Infants were tested for stranger and separation distress in a sparsely furished room. The procedure consisted of a series of 6 episodes : (a) baseline, (b) stranger entry, (c) mother departure, (d) stranger departure, (e) stranger re-entry, and (f) reunion with mother. On the same day before the 6-episode observation described above, a mother-infant interaction session was videotaped in an unstructured free-play situation lasting for 10 minutes.

3. *Assessments at 12 months.* The Ainsworth Strange Situation assessment was

conducted following the procedure described in Ainsworth et al (1978).

For further details concerning the assessments stated above, readers are referred to our previous report (Miyake et al, 1985).

RESULTS

Attachment behaviors in the Strange Situation at 12 months

In the previous report on our longitudinal study with Cohort 1, Miyake et al. (1985) predicted that the attachment classifications of Japanese infants in the Strange Situation would be very different from those in the United States. Miyake et al. predicted much higher proportion of Type-C infants and much lower proportion of Type-A babies in the Japanese sample as compared with similar American ones. This hypothesis was strongly supported. As seen in table 1, no infants out of 59 tested (29 from Cohort 1 and 30 from Cohort 2) were classified as Type-A babies. Fourteen infants (7 from Cohort 1 and 7 from Cohort 2) were clearly classified as Type-C babies. In addition, five infants were classified as "pseudo-C" infants (a designation conceived by Miyake et al., 1983). These infants show the typical pattern of Type-C babies (such as extreme crying, difficulty in soothing, and moderate levels of resistance upon reunion) during the second separation and reunion, but before then they were B-like, especially in not showing much resistance in the first reunion. The combined C plus pseudo-C group thus totaled 32% of our sample (38% of Cohort 1 and 27% of Cohort 2). Specifically, as shown in table 1, the distributions across attachment categories revealed in the two cohorts is quite similar to each other. We may fairly conclude that the results reported for Cohort 1 were replicated by those obtained for Cohort 2. Prototypical Type-C infants constituted 28% of the 25 Cohort 1 infants and 24% of the 29 Cohort 2 infants who were unambiguously classified.

TABLE 1

Number & Percentage of Attachment Classification

Attachment Classification	Cohort 1 (N=29)	Cohort 2 (N=30)	Cohort 1+2 (N=59)
A	0	0	0
B	18 (72%)	22 (75.9%)	40 (74.1%)
C	7 (28%)	7 (24.1%)	14 (25.9%)
Psuedo-C	4	1	5

Note – Numbers in parenthesis are the percentage of B & C classifications in the total subjects who are unequivocally classified.

Neonatal cry and attachment classification

Nineteen infants in Cohort 1 and 16 in Cohort 2 were tested for RIS successfully during the neonatal period, and then again at 12 months of age for attachment classification. The relation between their response to nipple removal and attachment classification was examined.

As shown in table 2, in both cohorts there was a marginally significant trend toward

TABLE 2

Infant Proness to Show Crying to Nipple Removal and Attachment Classification

Future Attachment Classification	Cohort 1		Cohort 2		Cohort 1+2	
	Crier	Non-Crier	Crier	Non-Crier	Crier	Non-Crier
B	6	5	5	6	11	11
C	7	1	5	0	12	1

more Type-C babies to be criers in the RIS task rather than noncriers (Cohort 1 : chi square=3.13, $p<.10$; Cohort 2 : chi square=3.20, $p<.10$).

By combining the RIS data of the two cohorts, we can obtain a statistically significant trend in the relation between attachment classification at 12 months and a tendency to show crying upon the nipple removal (chi square=4.77, $p<.05$).

Antecedents of attachment classification at 7.5 months

Infants' behavioral disposition toward extreme fearfulness was measured in the laboratory at 7.5 months. Specifically, infants' reactions to a male stranger and to maternal separation were observed. A global judgement of 'Fearfulness' was derived, computed as the presence of avoidance and negative vocalization, together with a decrease in play behavior relative to the baseline prior to the approach of the stranger. As shown in table 3, in Cohort 1, six out of 7 (85.7%) future-C infants were judged to be "fearful", whereas 2 out of 7 (28.6%) future-B infants were similary judged (Fisher's Exact Probability Test, $p<.05$). In Cohort 2, among 7 of the babies classified as C, six (85.7%) were judged to be "fearful", while 6 out of the sixteen (37.5%) babies classified as B were similarly judged (Fisher's Test, $p<.05$). When we combined the results obtained for the two cohorts, the relation between infants' disposition toward fearfulness at 7.5 months and attachment classification at 12 months was statistically significant at the 1% level (chi square=7.18).

TABLE 3

Infant Disposition toward Fearfulress in Lab at 7.5 Months and Attachment Classification

Future Attachment Classification	Cohort 1		Cohort 2		Cohort 1+2	
	Fearful Infants	Non-Fearful Infants	Fearful Infants	Non-Fearful Infants	Fearful Infants	Non-Fearful Infants
B	2	5	6	10	8	15
C	6	1	6	1	12	2

Mother-infant interaction was also observed at 7.5 months and was evaluated from videotapes for four dimensions of maternal responsiveness. The categories were stimulation, effectiveness of stimulation, responsiveness and intrusiveness (any maternal behavior that both interrupted the infant's ongoing activity without a bid by the infant and resulted in a change in the infants behavior). The frequencies of each of these four categories were measured during the 10-minute interaction in the laboratory. In our previous paper on the findings from Cohort 1 (1983), it was reported that mothers of future-B infants were found

to be significaltly less intrusive ($t=2.54$, $p<.005$) than mothers of future-C infants though both groups of mothers showed eqiuvalent rates of stimulation of their infants, and their stimulation was equivalently effective. This difference in intrusiveness between mothers of Type-B infants and mothers of Type-C infants was not replicated in Cohort 2 (Ms = 1.81 and 3.14, $t=1.48$, n.s.). We then classified the mothers of both cohorts into two types, namely 'intrusive' and 'non-intrusive' by the median of the frequency of maternal behaviors that indicated intrusiveness.

TABLE 4

Maternal Intrusiveness in Lab at 7.5 Months and Attachment Classification

Future Attachment Classification	Cohort 1		Cohort 2		Cohort 1+2	
	Intrusive Mothers	Non-Intrusive Mothers	Intrusive Mothers	Non-Intrusive Mothers	Intrusive Mothers	Non-Intrusive Mothers
B	4	6	6	10	10	16
C	6	2	4	3	10	5

As shown in table 4, the level of maternal intrusiveness at 7.5 months was not predictive of later attachment classification (Cohort 1 ; chi square = 2.21, n.s., Cohort 2 ; chi square = 0.77, n.s., Cohort 1+2 ; chi square = 2.00, n.s.). According to the assessments of the infants at 7.5 months of age, we may safely say that infant temperamental disposition to become fearful makes an important contribution to attachment classification. However, it is not yet possible to rule out the possibility of an interaction between the infant temperament and the mother's practices. As a prelimiary step to explore the way in which an infant's temperamental disposition acts upon maternal interactional style and vice-versa, the attachment types were broken down by the infants' degree of fearfulness measured at 7.5 months, as well as by the level of maternal intrusiveness. The results are shown in table 5.

TABLE 5

Maternal Intrusiveness × Infant Fearfulness and Attachment Classification

Future Attachment Classification	Cohort 1 Intrusive Mothers		Cohort 2 Intrusive Mothers		Cohort 1+2 Intrusive Mothers	
	Fearful Infants	Non-Fearful Infants	Fearful Infants	Non-Fearful Infants	Fearful Infants	Non-Fearful Infants
B	0	4	1	5	1	9
C	5	1	3	0	8	1

Since the number in each cell is too small, two cohorts were combined for statistical treatment. Among the 9 fearful infant + intrusive mother pairs, 8 (89%) were classified as Type-C at 12 months of age (chi square = 4.0, $p<.05$), whereas 9 (90%) out of 10 non-fearful infant + intrusive mother pairs were classified as Type-B later (chi square = 6.12, $p<.05$). The proportion of Type-C babies relative to Type-B babies was significantly higher for fearful infant + intrusive mother pairs (chi square = 9.61, $p<.01$). When testing the propor-

tion of C to B in the two cohorts separately, we can get marginally significant chi sqare values for both cohorts (Cohort 1 ; chi square=3.75, $p<.10$, Cohort 2 ; chi square=3.35, $p<.10$).

These findings indicate that the effects of the mother's intrusiveness are indeed different, according to the level of the infant's tendency to become fearful. Thus we may fairly conclude that infant temperamental disposition toward fearfulness makes a major contribution to later attachment classification, whereas maternal intrusiveness plays a minor role.

DISCUSSION

> After referring to our Cohort 1 study in his review paper, Sroufe (1985) argues that : The "Traditional" Japanese mother never leaves her infant alone-even briefly-over the entire course of the first year. It is understandable then that they would be thoroughly distressed when left alone in a strange setting. The Strange Situation was designed to be a mild "every day" stressor. Clearly, in the context of traditional Japanese culture, it is a stress situation of great magnitude, qualitatively different from all but the most unusual American cases. Moreover, in their effort to duplicate Ainsworth's procedure, the investigators allowed the separations to go on for 3 minutes regardless of amount of distress, rather than cutting the separations short, as is done here. Many infants will cry without readily settling if stressed enough. Given these distortions in the intent of the Ainsworth procedure, these assessments cannot be valid predictor of home attachment behavior (valid assessment of attachment)..... (p. 6)

First, we do not think our subjects were reared according to traditional patterns. In fact, they live in Japanese middle class families in Sapporo, one of the most modernized large cities in Japan (where the divorce rate is the highest among Japanese cities). Second, with Cohort 2, episode 6 (and in some cases, episodes 4 and 7 as well) was curtailed if the baby was unduly distressed. This resulted in a negligible decrease of the percentage of prototypical C infants among Cohort 2 subjects (24%) as compared to those in Cohort 1 (28%). However, we are not reluctant to admit the fact that there was only one pseudo-C infant among the Cohort 2 sample, whereas 4 infants in Cohort 1 were classified as pseudo-C babies. This may be ascribed to the effect of the curtailment of the separation episodes. However, since the distribution across A, B, C types in the two independent samples were quite similar and the percentage of pseudo-C babies was very small, there is no reason to cast doubt on our findings in the replication study.

Our findings from the two cohorts indicate the possibility of a temperamental disposition toward irritability in neonatal period and fearfulness in the second half of the first year, that could make a considerable contribution to the attachment classification. At the same time, we feel that constitutional characteristics of the infant cannot fully account for the Strange Situation classification. It is not yet clear how temperamental factors like irritability and fearfulness influence the attachment classification. Temperamental and maternal variables are likely to interact in the course of the first year to determine the pattern of attachment behavior. As described earlier, our data on the effects of maternal intrusiveness on the attachment classification are not clear.

Analysis of our data on mother-infant interaction observations in the home at 4 and 7.5 months of age for Cohort 2 infants will permit more objective assessment of both the affective quality of the mothers' interaction with the infant, and the contingency of the

mothers' response to the infants signal (Kanaya, in this volume).

Lamb et al (1985) propose the following :

> To evaluate more complex models, future studies must be designed to assess infant characteristics both within and outside of interactive situations, beginning early in the first year, in order to better understand the child's contributions to interactive harmony. In longitudinal analyses, stability of infant characteristics and their changing influence on adult-infant interaction over the first year could be appraised. (P. 113)

Presently we are planning to test a third cohort of mother-infant pairs in Sapporo, a process that will enable us to obtain data relevant to the point Lamb et al have emphasized.

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